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16. Abstract In the Robinson mining district which includes the Ruth porphyry copper mines, three large positive aeromagnetic anomalies exist over the Ward Mtn. area, the Ruth porphyry copper operations and over a Tertiary volcanic area north west of Ruth. Prior studies of this area have suggested that the volcanics may be the cause of the anomalies. Skylab S190A imagery, however, indicates possible outcrops in the volcanic area of the Paleozoic sediments. Field studies or ground truth verify the existence of these inliers suggesting that the magnetic anomaly may be the result of a buried intrusive body for which potential mineralization has been covered by the post-ore "blanket" of volcanics. The area is being mapped in more detail and samples of mercury-bearing soil-gas are being collected within and outside the area.					
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GEOLOGICAL AND GEOCHEMICAL STUDIES IN THE
ROBINSON MINING DISTRICT, WHITE PINE COUNTY,
NEVADA; USING SKYLAB S190A IMAGERY

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Preface

The major objective of the Skylab (EREP) contract is the application of S190A, S190B, and S192 imagery and data to mineral exploration and the detection and measurement of geothermal sites. Comparisons are also being done between ERTS-1 and EREP imagery.

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1. INTRODUCTION

Specific sites were located under Skylab (SL-2) during overpasses at which time a large number of temperature measurements were made for thermal IR correlations. Difficulties with Band 13 of S-192 has postponed the use of these data.

2. RESEARCH RESULTS

With the arrival of S190A and S190B imagery, the application of such to mineral exploration has met with greater application than anticipated. Although ERTS-1 imagery appears to be better in detecting structural breaks and/or linaments, S190 A&B color imagery is better for detecting lithologic tonal differences.

A significant and possible major economic example of the practical value of Skylab photographs is provided by locating on Skylab Camera Station No. 4, frame 010, SL-2, an area of exposures of limestone rocks which were thought to be completely covered by volcanic rocks based upon prior mapping.

The area is located less than 12 miles north of the Ruth Porphyry Copper deposit, White Pine County, Nevada. This is a major copper producing open pit mine owned by Kennecott Copper Corporation.

Geophysical maps consisting of gravity and aeromagnetic studies have been published by the U.S. Geological Survey (Geophysical Investigations, Map GP 392) indicating three large positive magnetic anomalies located at the Ruth ore deposits, the Ward Mountain mineralized area, and in the area previously thought to be completely covered by post-ore volcanics.

Skylab photos indicate, however, that erosion has removed volcanic covers in specific sites sufficient to expose the underlying older rocks, suggesting, therefore, that the volcanic rocks may not be the cause of the aeromagnetic anomaly. Field studies have verified the initial interpretations made from the Skylab photos.

The potential significance of this study is that the large positive aeromagnetic anomalies suggest the presence of cooled and solidified magma below the anomalies from which ore-bearing solutions may have been derived forming possibly large ore deposits.

3. NEW TECHNOLOGY (soil-gas mercury "sniffer")

Improvements are being made on the soil-gas collector that has been developed for application to the ERTS-1 and EREP Contracts. Soil-gas almost invariably contains mercury. Simple techniques have been experimented with that enable the collection and analysis of the mercury contained in the soil-gas.

An enclosed plastic hemisphere is placed on the ground at the specific collection site with the base buried several decimeters in the ground. A battery-powered fan draws the soil-gas from the ground. It passes through a small orifice in the enclosed collecting instrument and through one or more layers of silver screen. The mercury in the soil-gas forms an amalgam with the silver. The amount of mercury collected is determined by an atomic absorption instrument where the mercury is vaporized by heating the silver screen in a small furnace.

With only a few minutes of operation of the fan, adequate samples of mercury are obtained for analyses. The basic factors that indicate the usefulness of this exploration technique are as follows:

1. Mercury is associated as a trace element with the majority of mineral deposits.
2. The high vapor pressure of mercury allows it to continually "bleed" from a mineralized zone, even from considerable depths, where it can be trapped at the surface with the mercury soil-gas collecting apparatus.
3. Mercury can be detected with atomic absorption instruments in concentrations of less than 0.1 ppb. The average abundance of mercury in many rocks is roughly 50-100 ppb and more in mineralized zones.

4. RECOMMENDATIONS AND CONCLUSIONS

The location on Skylab S190A images of inliers of older rocks exposed in eroded portions of overlying Tertiary volcanic rocks have been verified by field study or ground truth.

A large position aeromagnetic anomaly at this site is comparable to the similar aeromagnetic anomalies located nearby in the Ruth porphyry copper area and the Ward Mountain mineralized zone.

It is possible that the volcanics are not as thick as formerly presumed, suggesting the possibility of an intrusive stock underlying the area which may have formed ore deposits for which there has been no surface evidence other than the aeromagnetic anomaly.

It is obvious that the area should be mapped in greater detail and additional mercury soil-gas samples should be collected in the area. Such recommendations are being initiated.